

# California Water Plan Update 2010

## New Investments in Water Portfolios

California Water and Environmental Water Forum  
Annual Meeting  
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# Overview of New Investments

- Water Portfolios Review
- Water Balance Development
- Water Use Application Development
- Vision



# What are Water Portfolios?

Water Portfolios represent actual year water conditions

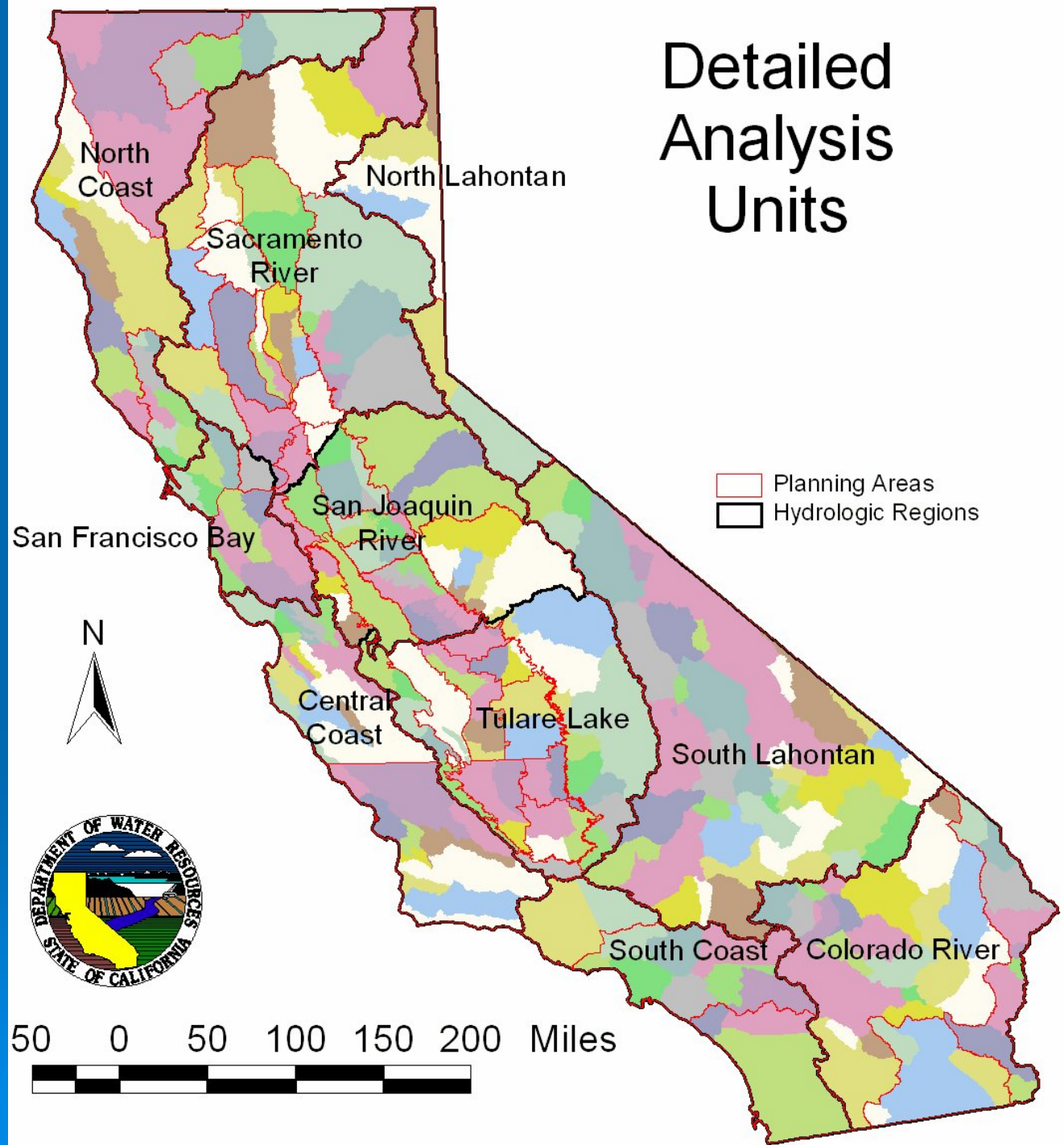
- Flow Diagram
  - Tracks the disposition (e.g. ocean, inland salt sink, atmosphere, storage) of all sources of water (e.g. precipitation, regional imports)
- Water Balances
  - Inflow-Outflow, Applied Water Use, Net Water Use, and Depletion
- Data Tables
  - Time series and other data showing historic trend information
- Narratives
  - Document hydrologic conditions, events, and management decisions
- Water Quality
  - Integrate water quality parameters to characterize water conditions

# Water Portfolio Data

- How many of you have used Water Plan Update data?
  - Agricultural Data (ET, EP, ETAW, CF, AW)
  - Urban Data (Per-Capita Water Use)
  - Managed Wetlands Data (ET, ETAW, AW)
  - Water Supplies (SW, GW, Reuse, Recycled)
  - Deep Percolation Estimates

# Update 2010

- Water balances for each Detailed Analysis Unit by County



# Water Balance Development

- Mass balances are difficult to apply
  - Limited data and staff resources to develop:
    - Rainfall-runoff and natural deep percolation recharge
    - Native vegetation ET
    - Stream accretion and depletion
    - Groundwater change in storage and lateral flow
- Apply Inflow-Outflow to Uses
  - Limit analysis to surface and rootzone
  - Develop applied water and consumptive use of applied water estimates
  - Determine the disposition of applied water
  - Use actual supply data or estimated diversions

# Inflow-Outflow Method

- Determine actual year uses and balance with supplies
  - Account for disposition of all uses, conveyance characteristics, deep percolation, reuse, etc.
  - First - balance each sector of use
  - Second - balance all sectors together, accounting for the movement of water between sectors, for example:
    - Urban WWTP discharge to drains for agricultural use, otherwise known as reuse
    - Agricultural return flows used by managed wetlands
    - Applied water, net water use, and depletion checks for estimating reuse, conveyance seepage, and deep percolation
  - Improve water routing linkages within and between DAU-County analysis areas



# Method

- Supplies
- Drain Water
- Reuse
- Reuse between sectors
- Depletions
- Deep percolation
- Intentional GW recharge
- Outflow
- Change in surface storage

## Developed Water Use Balance

Thousand Acre-Feet

Year: **1999**  
Detailed Analysis Unit (DAU) No.: **163**  
County No.: **06**

Scenario Type: **Actual Year**  
DAU Name: **Willows-Arbuckle**  
County Name: **Colusa**

	Agriculture	Managed Wetland	Urban	Total
<b>U</b> Local Surface Water	3.0	0.0	0.0	3.0
<b>E</b> Local Import	0.0	0.0	0.0	0.0
Ground Water - Unadjudicated	78.8	7.7	2.6	89.1
<b>O</b> Ground Water - Adjudicated	0.0	0.0	0.0	0.0
<b>F</b> Ground Water - Banked	0.0	0.0	0.0	0.0
Colorado River	0.0	0.0	0.0	0.0
<b>W</b> State Water Project	0.0	0.0	0.0	0.0
<b>A</b> Central Valley Project - Base	419.1	26.6	0.0	445.7
<b>T</b> Central Valley Project - Project	141.5	48.2	0.0	189.7
<b>E</b> Other Federal	0.0	0.0	0.0	0.0
<b>R</b> Ocean Desalination	0.0	0.0	0.0	0.0
Water from Refineries	0.0	0.0	0.0	0.0
<b>S</b> Water Transfers	0.0	0.0	0.0	0.0
<b>U</b> Inter-basin Water Transfers	0.0	0.0	0.0	0.0
<b>P</b> <b>Sub-Total (Prime Supply)</b>	642.4	82.5	2.6	727.5
<b>P</b> <u>Inflow Drain Water</u>				
<b>L</b> From Other DAUs within County and PA	0.0	0.0	0.0	0.0
<b>Y</b> From Same DAU, out of County, within PA	80.6	7.5	0.0	88.1
Carry-over Storage from Previous Water Year	44.4	15.0	0.0	59.4
<b>Total Use of Water Supply</b>	767.4	105.0	2.6	875.0
<b>R</b> <u>Reuse</u>	88.4	23.5	0.0	111.9
<b>R</b> Reuse - Wastewater Recycling				
<b>E</b> Reuse - Desalination				
<b>U</b> <u>Reuse Between Sectors</u>				
<b>S</b> Reuse of Agricultural Supply [Sector Balance Only]	0.0	0.0	0.0	0.0
<b>E</b> Reuse of Managed Wetlands Supply [Sector Balance Only]	0.0	0.0	0.0	0.0
<b>R</b> Reuse of Urban Supply [Sector Balance Only]	0.6	0.0	0.0	0.6
<b>Total Reuse of Supply from Other Sectors</b>	0.6	0.0	0.0	0.6
<b>ETAW</b>				
Evapotranspiration of Applied Water	454.1	40.1	1.2	495.4
Evaporation & Evapotranspiration of Applied Groundwater Recharge	0.0	0.0	0.0	0.0
<b>D</b> Evaporation and Evapotranspiration of Wastewater			0.1	0.1
<b>E</b> <u>Other Consumptive Losses</u>				
<b>P</b> Conveyance System Evaporation & Evapotranspiration	2.8	0.0	0.0	2.8
<b>L</b> Conveyance System Evaporation & Evapotranspiration		0.0	0.0	0.0
<b>E</b> Conveyance System Evaporation & Evapotranspiration			0.0	0.0
<b>E</b> <u>Drainage Losses</u>				
<b>T</b> Riparian ET	9.6	0.0	0.0	9.6
<b>I</b> Riparian ET		0.0	0.0	0.0
<b>O</b> Riparian ET			0.0	0.0
<b>N</b> Miscellaneous Agricultural Evapotranspiration	6.6	0.0	0.0	6.6
Miscellaneous Managed Wetland Evapotranspiration		1.2	0.0	1.2
<b>Total Depletion</b>	473.1	41.3	1.3	515.7
<b>D</b> <u>Conveyance</u>				
<b>E</b> Conveyance Seepage [not included in Balance]	67.4	0.0	0.0	67.4
<b>P</b> Conveyance Seepage [not included in Balance]		9.1	0.0	9.1
<b>P</b> Conveyance Seepage [not included in Balance]			0.0	0.0
<b>P</b> Conveyance Deep Percolation	22.6	0.0	0.0	22.6
<b>E</b> Conveyance Deep Percolation		0.0	0.0	0.0
<b>P</b> Conveyance Deep Percolation			0.0	0.0
<b>R</b> <u>Deep Percolation of Applied Water</u>				
<b>C</b> Deep Percolation of Applied Surface Water	8.3	0.1	0.0	8.4
Deep Percolation of Applied Groundwater	7.8	0.1	0.7	8.6
Deep Percolation of Groundwater Recharge	0.0	0.0	0.0	0.0
<b>Total Deep Percolation</b>	38.7	0.2	0.7	39.6
<b>Return Flows to Developed Supply</b>				
To Other DAUs within County within PA	13.0	4.7	0.0	17.7
To Same DAU, Out of County within PA	26.7	9.1	0.0	35.8
To Other DAU, Out of County within PA	0.0	0.0	0.0	0.0
Out of PA	129.1	45.9	0.0	175.0
Out of HR	0.0	0.0	0.0	0.0
<b>Conveyance Return Flows to Developed Supply</b>				
To Other DAUs within County within PA	2.8	0.4	0.0	3.2
To Other DAUs within County within PA			0.0	0.0
To Other DAUs within County within PA			0.0	0.0
<b>Outflow to Other Sector of Use within DAU/County</b>				
Outflow as Reuse to Agricultural Sector			0.6	0.6
Outflow as Reuse to Managed Wetland Sector			0.0	0.0
Outflow as Reuse Outflow to Urban Sector			0.0	0.0
<b>Total Outflow</b>	196.8	63.5	0.6	260.9
<b>Change in Surface Storage (Drainage Carry-over to Next Water Year)</b>	59.4	0.0	0.0	59.4
<b>DAU/County Balance Condition: BALANCED</b>	0.0	0.0	0.0	0.0



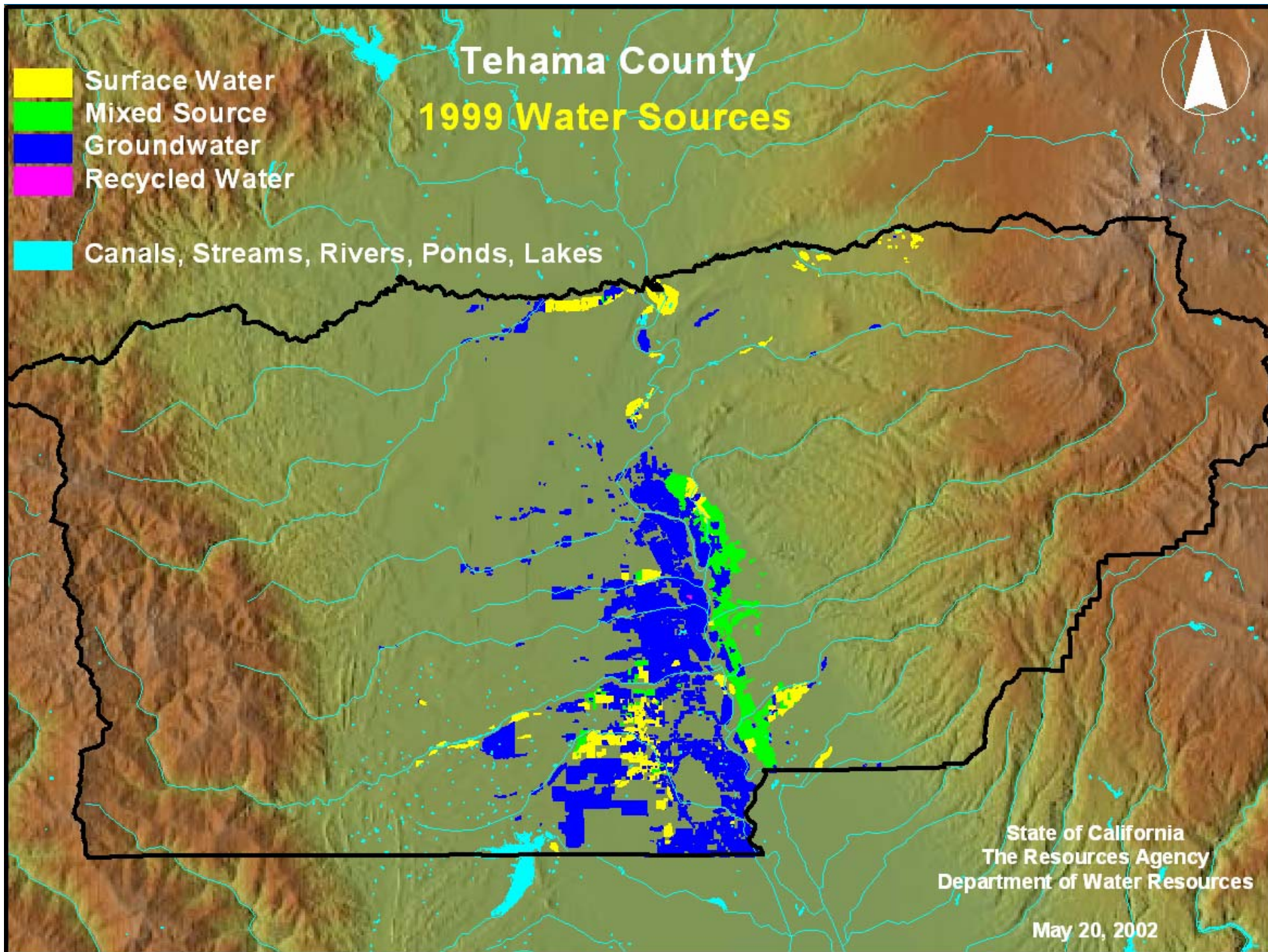
# Inflow-Outflow Method Refinement

- Understanding reuse
  - Very common with the rice and managed wetland areas of the Sacramento Valley
    - Goal is to map privately managed wetland land use
  - $\text{Supply} = \text{Applied Water} - \text{Reuse} + \text{Conveyance}$



# Water Supplies

- Water supplies defined by sector of use
  - Agricultural, urban, Managed Wetlands
- Estimating agricultural groundwater pumping
  - Water source mapping by field for Northern Sacramento Valley is the basis for Land Use based Groundwater extraction estimates
  - Elsewhere, goal is to differentiate, where possible, the use of surface water and groundwater by field or regionally to refine estimates of land use based groundwater estimates





# Agricultural Water Use Initiative

- California Agricultural Water Use Model
  - Monthly time-step water use calculations
  - Daily precipitation/infiltration preprocessor
    - SCS Method
  - Soil moisture balance methodology
    - Uses SCS Soil Survey data
  - ET, EP, ETAW
  - Estimates of precipitation deep percolation

## California Agricultural Water Use Model

- Input ...
- Reports ...
- Calculate ETAW ...
- Calculate Ag Water Use ...
- Maintenance ...
- About this model
- Exit



# Agricultural Water Use Initiative

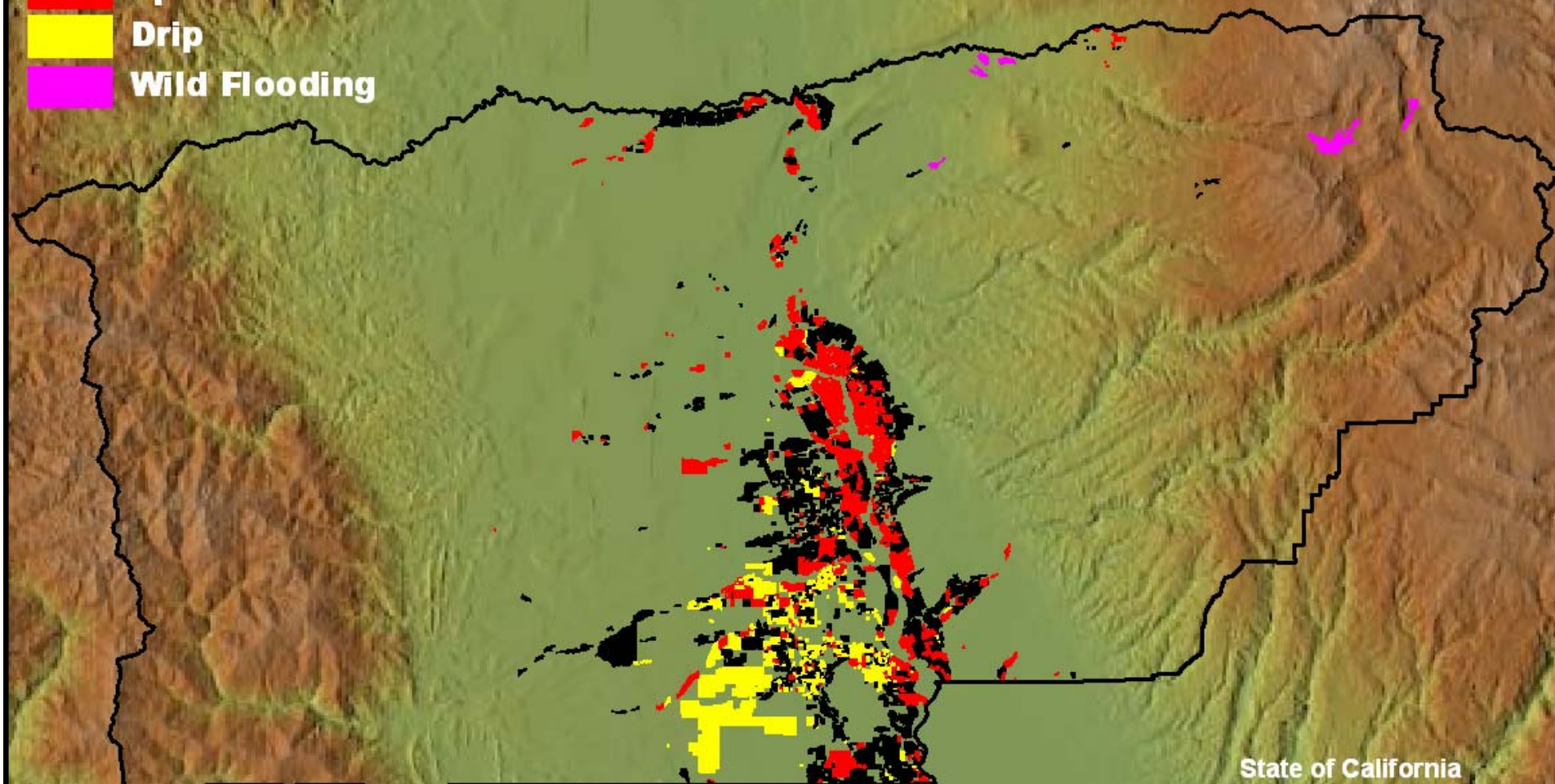
- Applied Water – Uses farm data
  - Compute consumed fractions (ETAW/AW) from:
    - Application fractions, cultural practices, rice decomposition, rice ponding, winter ponding (duck clubs), etc.
- Collect irrigation methods
- Expand model to aggregate data from smaller units than a DAU/County
  - Cover water districts, grouping of water service areas or unorganized areas, etc.

# Tehama County

## Irrigation Methods in Use 1999



-  **Furrow / Border**
-  **Sprinkler**
-  **Drip**
-  **Wild Flooding**



State of California  
The Resources Agency  
Department of Water Resources

May 20, 2002



# Wetlands Water Use Initiative

- Managed Wetlands Model (*to be developed*)
  - Develop database application as module of Ag Water Use Model
    - Currently a spreadsheet analysis by refuge or privately managed wetland grouping
    - Monthly time-step with daily precipitation processor
    - Determines land use based ETAW, ET, AW by habitat type
  - Refine flood-up, drawdown, seepage, deep percolation, irrigation requirements, ponding, circulation flow, ponding depths, outflow

# Urban Water Use Initiative

- California Urban Water Use Model

- Developing database application

- Monthly time-step

- Indoor/Outdoor Use

- Water use by supplier type

- Public Water Supply systems

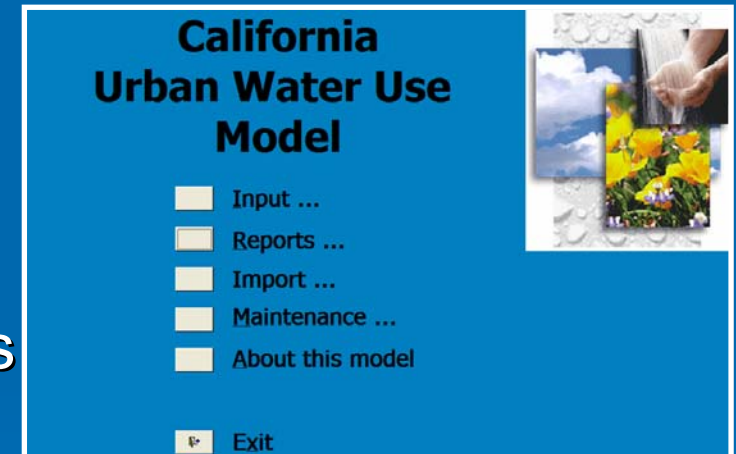
- Self-supplied water users

- Industrial, small communities, golf courses

- Estimate water uses for unorganized areas

- Water use by customer class

- Single Family Residential, Multi-Family Residential, Commercial, Industrial, Large Landscape

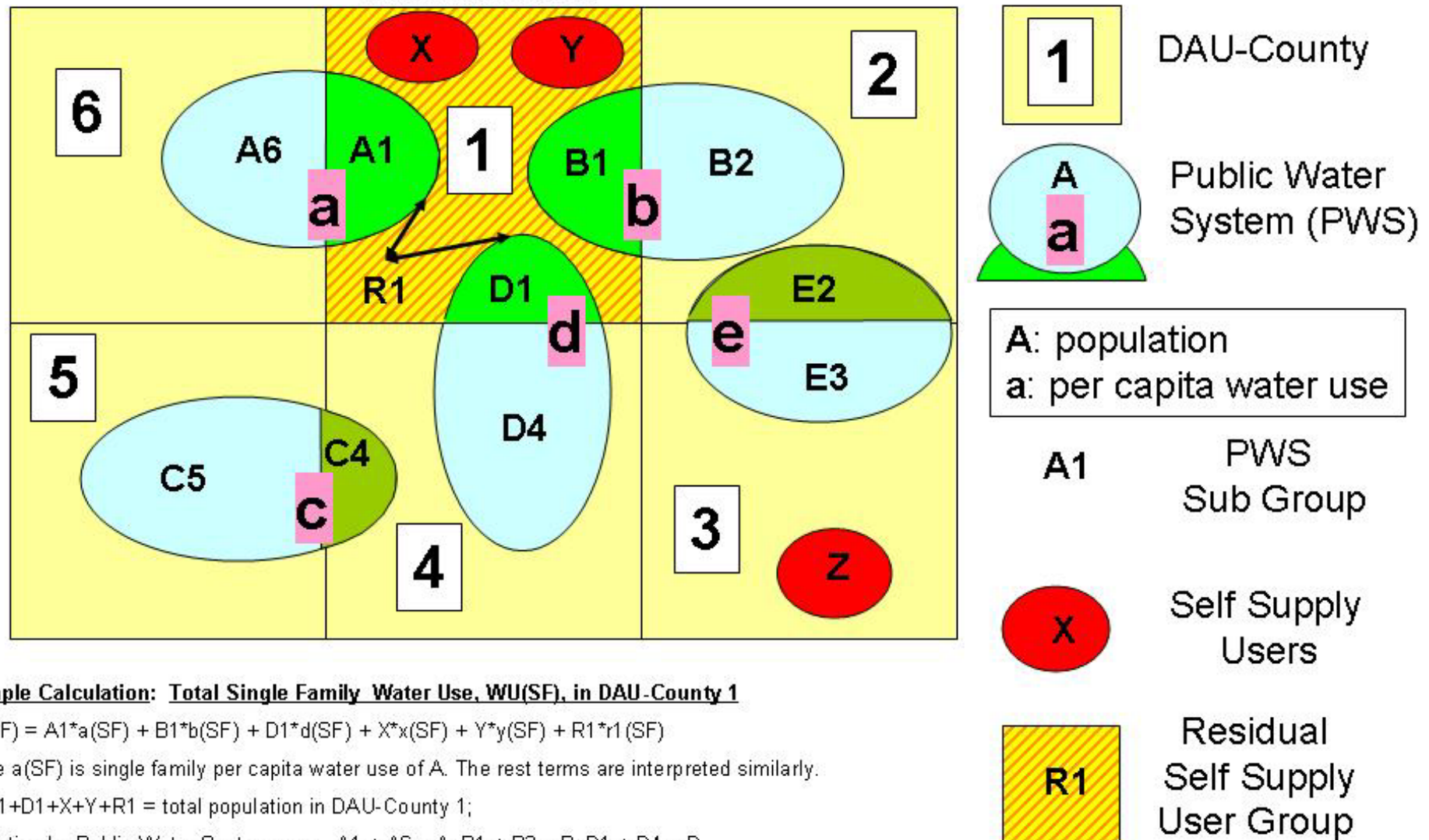


# Urban Water Use Initiative

- California Urban Water Use Model
  - Water balance to evaluate disposition of uses and store associated datasets, including
    - Wastewater Treatment data, NPDES permits
    - Estimates of septic tanks usage
    - Landscape acreage and irrigation (AW, ETAW)
    - Deep Percolation
    - Recycled water
    - Reuse

# Aggregate smallest units of analysis

## Urban Water Use Schematic



# Vision

- Determine useful analysis areas
  - DAU-County?
  - Watershed?
  - Water district or water agency?
  - Groundwater basin?
  - How will the data fit with Integrated Regional Water Management Planning?
- Evaluate detail needed for modeling and scenario evaluation



# Questions?

## Visit the California Water Plan Website

[www.waterplan.water.ca.gov](http://www.waterplan.water.ca.gov)



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California Water Plan



The **California Water Plan** provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future. The Plan, which is updated every five years, presents basic data and information on California's water resources including water supply evaluations and assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The Plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the State's water needs.

Our goal for the **California Water Plan Update** is to meet [Water Code](#) requirements, receive broad support among those participating in California's water planning, and be a useful document for the public, water planners throughout the state, legislators and other decision-makers.

### California Water Plan News



- The **California Water and Environmental Modeling Forum (CWEMF)** is holding its annual meeting at Asilomar on February 26-28. The California Water Plan session is scheduled on February 27th. For more information on registering for this event go to <http://www.cwemf.org/Calendar/asilomar07.htm>.  
▶ [CWEMF Agenda](#) (.pdf, 398 kb) ▶ [Water Plan Abstracts](#) (.pdf, 19 kb)



- Statewide Water Analysis Network (SWAN)** is holding a meeting on Wednesday, January 24, please see the [meeting materials](#) for more information. (01-10-2007)



- "**Refining Estimates of Water-Related Energy Use in California**", California Energy Commission report available online. [more...](#) (01-03-2007)



- Delta Vision Web Portal Launched** -- The Delta Vision Web Portal is now online and may be accessed at [www.deltavision.ca.gov](http://www.deltavision.ca.gov). This new web portal will provide the gateway for agency representatives and the public seeking information concerning Delta Vision Planning activities and events. (11-17-2006)



- Gov. Schwarzenegger signs Executive Order to Develop Strategic Vision for Delta.** In conjunction with the signing of [SB 1574](#) by Sheila Kuehl (D-Santa Monica), Governor Schwarzenegger signed an executive order to develop a Delta Vision. For details, see the Governor's Office press release and full text of Executive Order S-17-06. [more...](#) (09-29-2006)



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